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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/533,450	03/23/2000	Mark D. Lund	10991387-1	9914

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EXAMINER

LEE, TOMMY D

ART UNIT	PAPER NUMBER
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2624

DATE MAILED: 03/19/2004

9

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/533,450

**Applicant(s)**

LUND, MARK D.

**Examiner**

Thomas D. Lee

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12-14 is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Response to Amendment***

1. This Office action is responsive to applicant's AMENDMENT, filed January 9, 2004. Claims 1-14 are pending.

***Response to Arguments***

2. Applicant's arguments, see pages 5-8 of AMENDMENT, filed January 9, 2004, with respect to the rejection(s) of claim(s) 1-14 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of U.S. Patents 5,231,519 (Koike) and 4,866,532 (Ayata et al.).

Upon review of applicant's remarks, especially on page 7, beginning at line 5 (lines 15-29 in particular), it is agreed that combining the teachings of Ayata et al. and Koike in the manner suggested in the prior rejection would render Ayata et al. inoperable. However, it is believed that the two teachings may be combined in a manner such that applicant's claimed invention may be obtained by one of ordinary skill in the art. The reasons for rejection of the claims are as follows.

***Claim Rejections - 35 USC § 103***

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koike in view of Ayata et al.

Regarding claims 1, 4 and 5, Koike teaches a method for enhancing the resolution of black image regions rendered at a resolution of color image regions, the black image regions and color image regions being represented by pixels, the black image regions and color image regions having a first resolution being lower than a maximum black printing resolution of a printer, the method comprising: generating black pixels and color pixels at said first resolution (input part 1 (Fig. 6) generates standard resolution pixels of image signal DT); for each original pixel of the black image region having the first resolution, multiplying said pixel in two dimensions to obtain a first array of pixels, so as to represent the original pixel by a plurality of target pixels in the first array (pixel density converter 2 converts all pixels (inherently including all black pixels) to high resolution (column 4, lines 22-43) by multiplying in two dimensions (column 6, lines 49-64)); selecting a plurality of neighboring pixels, said target pixels and neighboring pixels constituting a pixel window (Figs. 12A – 12D, 14A – 14D); applying the pixels in the pixel window to a logic circuit having a plurality of empirically determined logical conditions (pixel density converter comprises logic circuitry (column 5, line 47 – column 6, line 36)); and determining enhanced resolution pixels for the target pixels based on whether said pixel window meets one of the plurality of logical conditions (column 5, lines 36-46; column 6, lines 49-64)).

Koike further prints said enhanced resolution pixels at a second resolution (receiver facsimile machine prints at fine resolution (column 6, lines 37-42)). However, Koike does not teach printing color pixels at said first resolution, since all pixels are converted to the fine resolution.

Ayata et al. teach a printing apparatus, where color pixels not requiring high resolution are automatically reproduced with lower resolution while maintaining high resolution at black portions of the same image (Abstract; column 14, line 20 – column 15, line 9). Ayata et al. state that recording in colors other than black at high resolution results in high manufacturing costs and is very uneconomical (column 1, lines 46-57). Therefore, it would have been obvious for one of ordinary skill in the art to modify the teaching of Koike by converting color pixels at the high resolution back to the standard resolution prior to printing, so as to reduce such costs.

Regarding claim 2, the selection through determining steps as taught by Koike are inherently repeated until all of the original pixels have been processed, thereby completing processing for an entire image.

Regarding claim 3, the first and second resolutions taught by Ayata et al. are 8 and 16 dots/mm (203 and 406 dpi), as opposed to 300 and 600 dpi, as recited in the claim. The choice of resolutions depends upon the capabilities of the printer, and is thus a matter of design choice to one of ordinary skill in the art.

Regarding claims 6 and 7, Koike teaches a window row size of 3 pixels (Fig. 11, 12, 14), which is less than a word size (16 pixels). The actual size of the pixel window is a matter of design choice to one of ordinary skill in the art.

Regarding claims 8, 9 and 11, Koike teaches an apparatus for enhancing the resolution of black image regions rendered at a resolution of color image regions, the black image regions and color image regions being represented by pixels, the black image regions and color image regions having a first resolution, the first resolution being

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lower than a maximum black printing resolution of a printer, the apparatus comprising: an upscaling circuit for multiplying black pixels to form a first array of black pixels, said first array including a group of target pixels (pixel density converter 2 converts all pixels (inherently including all black pixels) to high resolution (column 4, lines 22-43) by multiplying in two dimensions (column 6, lines 49-64)); and a logic circuit comprising a logic array for receiving said target pixels and neighboring pixels, forming a window of pixels, said logic circuit applying empirically derived logical conditions to said window of pixels and identifying enhanced resolution pixels for said group of target pixels (pixel density converter comprises logic circuitry (column 5, line 47 – column 6, line 36)).

Koike further provides at least one printhead for printing said enhanced resolution pixels at a second resolution (receiver facsimile machine prints at fine resolution (column 6, lines 37-42)). As mentioned above, while Koike does not teach printing color pixels at said first resolution, Ayata et al. teach a printing apparatus, where color pixels not requiring high resolution are automatically reproduced with lower resolution while maintaining high resolution at black portions of the same image (Abstract; column 14, line 20 – column 15, line 9). Ayata et al. state that recording in colors other than black at high resolution results in high manufacturing costs and is very uneconomical (column 1, lines 46-57). Therefore, it would have been obvious for one of ordinary skill in the art to modify the teaching of Koike by converting color pixels at the high resolution back to the standard resolution prior to printing, so as to reduce such costs.

Regarding claim 10, the first and second resolutions taught by Ayata et al. are 8 and 16dots/mm (203 and 406 dpi), as opposed to 300 and 600 dpi, as recited in the

claim. As mentioned above with regard to claim 3, the choice of resolutions depends upon the capabilities of the printer, and is thus a matter of design choice to one of ordinary skill in the art.

***Allowable Subject Matter***

5. Claims 12-14 are allowed.
6. The following is a statement of reasons for the indication of allowable subject matter: The cited prior art references do not disclose or suggest separation of black pixels from color pixels to form a black field, on which the black pixels are multiplied and subjected to logic operations to reduce jagged edges, prior to printing the black pixels at an increased resolution and printing the color pixels at the first resolution, as recited in base claim 12.

***Conclusion***

In view of new grounds for rejection not necessitated by amendment, this Office action is non-final.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas D. Lee whose telephone number is (703) 305-4870. The examiner can normally be reached on Monday-Friday (7:30-5:00), alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on (703) 308-7452. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Thomas D. Lee  
Primary Examiner  
Art Unit 2624

tdl  
March 19, 2004